

Ser. No. 10/536,829  
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NGB.534

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**AMENDMENTS TO THE CLAIMS**

**Please cancel claims 1 and 8 without prejudice or disclaimer.**

1. (Canceled)

2. (Currently amended) A The nonaqueous electrolyte of claim 1, comprising:

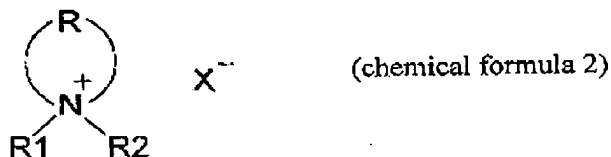
an organic solvent and a lithium salt dissolved in the organic solvent; and

a quaternary ammonium salt in an amount of 0.06 mol/L or greater and 0.5 mol/L or less,

characterized in that the quaternary ammonium salt having has a structure represented by any of  
(chemical formula 1), (chemical formula 2), and (chemical formula 3):



(wherein R1, R2, R3, and R4 each are either an alkyl group having 1-6 carbon atoms or an alkyl group in which at least part of the hydrogen atoms each has been replaced by a fluorine atom; and X<sup>-</sup> is a fluorine-containing anion, and wherein R1=R2=R3=R4 is excluded).

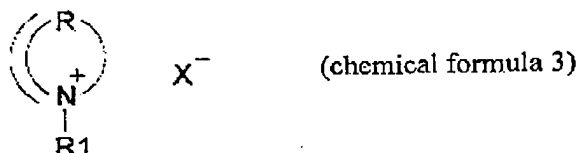


(wherein R is a divalent organic linking group having a main chain which has 4-5 atoms and is constituted of at least one member selected from carbon, oxygen, nitrogen, sulfur, and phosphorus; R1 and R2 each are either an alkyl group having 1-6 carbon atoms or an alkyl group in which at least part of the hydrogen atoms each has been replaced by a fluorine atom; and X<sup>-</sup> is a

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fluorine-containing anion),



(wherein R is an organic linking group or an organic linking group forming an aromatic ring, the organic linking groups each having a main chain which has 4-5 atoms and is constituted of at least one member selected from carbon, oxygen, nitrogen, sulfur, and phosphorus and having one single-bond end and one double-bond end; R1 is an alkyl group having 1-6 carbon atoms or an alkyl group in which at least part of the hydrogen atoms each has been replaced by a fluorine atom; and X<sup>-</sup> is a fluorine-containing anion).

3. (Currently amended) The nonaqueous electrolyte of claim 2 +, wherein said organic solvent comprises ~~characterized by containing~~ one or more organic solvents selected from the group consisting of ethylene carbonate, propylene carbonate, butylene carbonate,  $\gamma$ -butyrolactone, and  $\gamma$ -valerolactone.
4. (Currently amended) The nonaqueous electrolyte of claim 2 +, wherein ~~characterized in that the anion species contained in~~ the nonaqueous electrolyte comprises ~~is~~ one or more members selected from the group consisting of  $\text{BF}_4^-$ ,  $\text{PF}_6^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{N}(\text{CF}_3\text{SO}_2)_2^-$ ,  $\text{N}(\text{C}_2\text{F}_5\text{SO}_2)_2^-$ ,  $\text{N}(\text{CF}_3\text{SO}_2)(\text{C}_4\text{F}_9\text{SO}_2)^-$ ,  $\text{C}(\text{CF}_3\text{SO}_2)_3^-$ , and  $\text{C}(\text{C}_2\text{F}_5\text{SO}_2)_3^-$ .
5. (Currently amended) A nonaqueous-electrolyte battery, comprising: ~~which comprises~~ a positive electrode, a negative electrode, and a nonaqueous electrolyte according to ~~, the battery having been fabricated using the nonaqueous electrolyte of claim 2~~ +.

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6. (Currently amended) The nonaqueous-electrolyte battery of claim 5, wherein characterized in  
that the negative electrode comprises ~~employs~~ a graphite.

7. (Currently amended) The nonaqueous-electrolyte battery of claim 5, further comprising:  
~~characterized by having~~

a sheath formed over said positive and negative electrodes and said electrolyte, said sheath  
comprising a metal/resin composite material.

8. (Canceled)

9. (Currently amended) A nonaqueous-electrolyte battery which comprises a positive electrode, a  
negative electrode, and a nonaqueous electrolyte according to, ~~the battery having been fabricated~~  
~~using the nonaqueous electrolyte of claim 3.~~

10. (Currently amended) A nonaqueous-electrolyte battery which comprises a positive electrode,  
a negative electrode, and a nonaqueous electrolyte according to, ~~the battery having been fabricated~~  
~~using the nonaqueous electrolyte of claim 4.~~

11. (New) The nonaqueous electrolyte of claim 2, wherein said organic solvent comprises a  
member selected from the group consisting of propylene carbonate and butylene carbonate.

12. (New) A nonaqueous electrolyte, comprising:

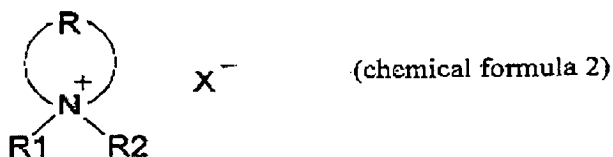
an organic solvent and a lithium salt dissolved in the organic solvent; and  
a quaternary ammonium salt in an amount of 0.06 mol/L or greater and 0.5 mol/L or less,  
the quaternary ammonium salt having a structure represented by any of (chemical formula 1),  
(chemical formula 2), and (chemical formula 3):

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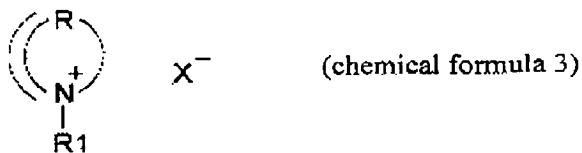
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(wherein the quaternary ammonium salt having a structure represented by chemical formula 1 comprises a member selected from the group consisting of  $(\text{CH}_3)_4\text{NBF}_4$ ,  $(\text{CH}_3)_4\text{NBr}$ ,  $(\text{CH}_3)_4\text{N}(\text{CF}_3\text{SO}_2)_2\text{N}$ ,  $(\text{CH}_3)_4\text{N}(\text{C}_2\text{F}_5\text{SO}_2)_2\text{N}$ ,  $(\text{C}_2\text{H}_5)_4\text{NBF}_4$ ,  $(\text{C}_2\text{H}_5)_4\text{NClO}_4$ ,  $(\text{C}_2\text{H}_5)_4\text{NI}$ ,  $(\text{C}_2\text{H}_5)_4\text{N}(\text{CF}_3\text{SO}_2)_2\text{N}$ ,  $(\text{C}_2\text{H}_5)_4\text{N}(\text{C}_2\text{F}_5\text{SO}_2)_2\text{N}$ ,  $(\text{C}_3\text{H}_7)_4\text{NBr}$ ,  $(n\text{-C}_4\text{H}_9)_4\text{NBF}_4$ ,  $(n\text{-C}_4\text{H}_9)_4\text{N}(\text{CF}_3\text{SO}_2)_2\text{N}$ ,  $(n\text{-C}_4\text{H}_9)_4\text{N}(\text{C}_2\text{F}_5\text{SO}_2)_2\text{N}$ ,  $(n\text{-C}_4\text{H}_9)_4\text{NClO}_4$ ,  $(n\text{-C}_4\text{H}_9)_4\text{NI}$ ,  $(\text{C}_2\text{H}_5)_4\text{N-maleate}$ ,  $(\text{C}_2\text{H}_5)_4\text{N-benzoate}$ , and  $(\text{C}_2\text{H}_5)_4\text{N-phthalate}$ ),



(wherein R is a divalent organic linking group having a main chain which has 4-5 atoms and is constituted of at least one member selected from carbon, oxygen, nitrogen, sulfur, and phosphorus; R1 and R2 each are either an alkyl group having 1-6 carbon atoms or an alkyl group in which at least part of the hydrogen atoms each has been replaced by a fluorine atom; and X<sup>-</sup> is a fluorine-containing anion),



(wherein R is an organic linking group or an organic linking group forming an aromatic ring, the organic linking groups each having a main chain which has 4-5 atoms and is constituted of at least

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one member selected from carbon, oxygen, nitrogen, sulfur, and phosphorus and having one single-bond end and one double-bond end; R1 is an alkyl group having 1-6 carbon atoms or an alkyl group in which at least part of the hydrogen atoms each has been replaced by a fluorine atom; and X<sup>-</sup> is a fluorine-containing anion).

13. (New) The nonaqueous electrolyte of claim 2, wherein the quaternary ammonium salt having a structure represented by chemical formula 2 comprises a combination of an anion and a member selected from the group consisting of a pyrrolidinium cation, piperidinium cation, and pyrrolium cation.

14. (New) The nonaqueous electrolyte of claim 13, wherein the pyrrolidinium cation comprises a member selected from the group consisting of a 1,1-dimethylpyrrolidinium ion, 1-ethyl-1-methylpyrrolidinium ion, 1-methyl-1-propylpyrrolidinium ion, and 1-butyl-1-methylpyrrolidinium ion,

wherein the piperidinium cation comprises a member selected from the group consisting of a 1,1-dimethylpiperidinium ion, 1-ethyl-1-methylpiperidinium ion, 1-methyl-1-propylpiperidinium ion, and 1-butyl-1-methylpiperidinium ion, and

wherein the pyrrolium cation comprises a member selected from the group consisting of a 1,1-dimethylpyrrolium ion, 1-ethyl-1-methylpyrrolium ion, 1-methyl-1-propylpyrrolium ion, and 1-butyl-1-methylpyrrolium ion.

15. (New) The nonaqueous electrolyte of claim 2, wherein the quaternary ammonium salt represented by chemical formula 3 comprises a combination of an anion and a member selected from the group consisting of an imidazolium cation, pyrazolium cation, pyrrolinium cation, and pyridinium cation.

16. (New) The nonaqueous electrolyte of claim 15, wherein the imidazolium cation comprises a member selected from the group consisting of a 1,3-dimethylimidazolium ion,

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1-ethyl-3-methylimidazolium ion, 1-butyl-3-methylimidazolium ion, 1,2,3-trimethylimidazolium ion, 1,2-dimethyl-3-ethylimidazolium ion, 1,2-dimethyl-3-propylimidazolium ion, and 1-butyl-2,3-dimethylimidazolium ion,

wherein the pyrazolium cation comprises a member selected from the group consisting of a 1,2-dimethylpyrazolium ion, 1-ethyl-2-methylpyrazolium ion, 1-propyl-2-methylpyrazolium ion, and 1-butyl-2-methylpyrazolium ion,

wherein the pyrrolinium cation comprises a member selected from the group consisting of a 1,2-dimethylpyrrolinium ion, 1-ethyl-2-methylpyrrolinium ion, 1-propyl-2-methylpyrrolinium ion, and 1-butyl-2-methylpyrrolinium ion, and

wherein the pyridinium cation comprises a member selected from the group consisting of an N-methylpyridinium ion, N-ethylpyridinium ion, N-propylpyridinium ion, N-butylpyridinium ion, 1-ethyl-2-methylpyridinium, 1-butyl-4-methylpyridinium, and 1-butyl-2,4-dimethylpyridinium.

17. (New) The nonaqueous electrolyte of claim 15, wherein the anion comprises a member selected from the group consisting of a chlorine anion, bromine anion,  $\text{ClO}_4$  anion,  $\text{BF}_4$  anion,  $\text{PF}_6$  anion,  $\text{CF}_3\text{SO}_3$  anion,  $\text{N}(\text{CF}_3\text{SO}_2)_2$  anion,  $\text{N}(\text{C}_2\text{F}_5\text{SO}_2)_2$  anion,  $\text{N}(\text{CF}_3\text{SO}_2)(\text{C}_4\text{F}_9\text{SO}_2)$  anion,  $\text{C}(\text{CF}_3\text{SO}_2)_3$  anion, and  $\text{C}(\text{C}_2\text{F}_5\text{SO}_2)_3$  anion.

18. (New) The nonaqueous electrolyte of claim 2, wherein said amount of said quaternary ammonium salt is 0.1 mol/L or greater and 0.35 mol/L or less.

19. (New) The nonaqueous electrolyte of claim 2, wherein said lithium salt comprises a member selected from the group consisting of  $\text{LiBF}_4$ ,  $\text{LiPF}_6$ ,  $\text{LiCF}_3\text{SO}_3$ ,  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ ,  $\text{LiN}(\text{C}_2\text{F}_5\text{SO}_2)_2$ ,  $\text{LiN}(\text{CF}_3\text{SO}_2)(\text{C}_4\text{F}_9\text{SO}_2)$ ,  $\text{LiC}(\text{CF}_3\text{SO}_2)_3$ , and  $\text{LiC}(\text{C}_2\text{F}_5\text{SO}_2)_3$ .

20. (New) A nonaqueous-electrolyte battery, comprising:

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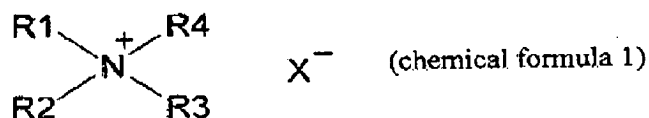
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a power generating unit comprising a positive electrode, a negative electrode, and a separator interposed between said positive and negative electrodes; and

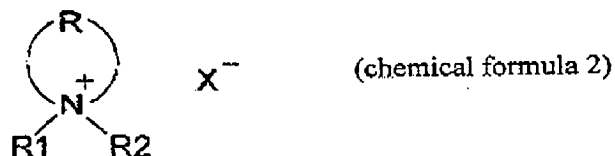
a nonaqueous electrolyte impregnated into said power generating unit, said nonaqueous electrolyte comprising:

an organic solvent and a lithium salt dissolved in the organic solvent; and

a quaternary ammonium salt in an amount of 0.06 mol/L or greater and 0.5 mol/L or less, the quaternary ammonium salt having a structure represented by any of (chemical formula 1), (chemical formula 2), and (chemical formula 3):



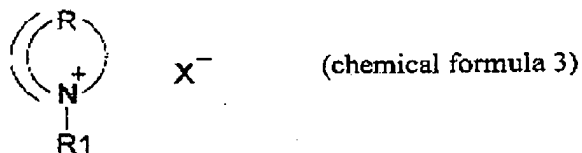
(wherein R1, R2, R3, and R4 each are either an alkyl group having 1-6 carbon atoms or an alkyl group in which at least part of the hydrogen atoms each has been replaced by a fluorine atom; and X<sup>-</sup> is a fluorine-containing anion, and wherein R1=R2=R3=R4 is excluded),



(wherein R is a divalent organic linking group having a main chain which has 4-5 atoms and is constituted of at least one member selected from carbon, oxygen, nitrogen, sulfur, and phosphorus; R1 and R2 each are either an alkyl group having 1-6 carbon atoms or an alkyl group in which at least part of the hydrogen atoms each has been replaced by a fluorine atom; and X<sup>-</sup> is a fluorine-containing anion),

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(wherein R is an organic linking group or an organic linking group forming an aromatic ring, the organic linking groups each having a main chain which has 4-5 atoms and is constituted of at least one member selected from carbon, oxygen, nitrogen, sulfur, and phosphorus and having one single-bond end and one double-bond end; R1 is an alkyl group having 1-6 carbon atoms or an alkyl group in which at least part of the hydrogen atoms each has been replaced by a fluorine atom; and X<sup>-</sup> is a fluorine-containing anion).